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**Technological Advancements on Selected Accounting  
Practices: A Study on Big data Analytics, Automation, and  
Artificial Intelligence in Sri Lanka**

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Degree of Master of Business Administration in Information Technology

Department of Computer Science and Engineering

University of Moratuwa

Sri Lanka

August 2024

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The dissertation was submitted to the Department of Computer Science and Engineering of the University of Moratuwa in partial fulfilment of the requirement for the Degree of Master of Business Administration in Information Technology.

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## ABSTRACT

Technology has been shaping the world day by day with modern inventions. Individuals, organizations, and industries have changed according to developments. Big data analytics, automation, and artificial intelligence (AI) are in the process of changing accounting practices continuously and embracing the profession widely. Though there are higher interventions, the impact of these technologies on efficiency, accuracy, and productivity of accounting practices remains unclear. By identifying the level of impact, organizations can actively use these technological advancements in operations. Further, it helps to formulate strategies and maintains its competitive edge.

Objectives are to identify the current integration of technological advancements in accounting practices, investigate the efficiency, accuracy, and productivity of these technologies, identify the challenges and barriers that arise when integrating these technologies, to come up with strategies to overcome challenges, and increase integration of technological advancements.

Primarily integration of big data analytics tools and AI seems low with accounting practices. Main issues with lower integration are lack of skilled personnel and cost and resource constraints. Big data analytics tools are mainly used for data visualizations and AI use of predictive analytics for financial decisions. However, automation is widely used by accounting professionals.

To investigate the efficiency, accuracy, and productivity of technological advancements, hypothesis was developed and tested. Outcomes show, integration of big data analytics tools significantly increases the efficiency of financial reporting, integration of automation significantly increases the accuracy of financial data and information, and integrated AI software significantly increases productivity of professionals. Therefore, organizations need to prepare their future and strategies to get the most from these advancements.

Main challenges and barriers to integration of technological advancements are lack of technical skills and expertise, change management and user resistance, and data quality and standardization issues. To overcome those challenges, there must be training and developments, collaborations with industry professionals, partnering with technology vendors, and standardizing data and systems

This study highlights the need for enhanced integration of Big Data Analytics, Automation, and AI in selected accounting practices. Addressing challenges like skill shortages, change management, user resistance, and data standardization can significantly boost integration. Organizations must invest in training and strategic partnerships to fully capitalize on these technological advancements.

**Keywords:** Accounting, big data analytics, automation, artificial intelligence, accountants.

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## **LIST OF ABBREVIATIONS**

AI = Artificial Intelligence

RPA = Robotic Process Automation

# 1. INTRODUCTION

## 1.1. Background

Accounting plays a key role in every organization. Accounting can be simply identified as recording past data with, managing those, and making important decisions for the benefit of the organization (Lunt, 2008). Therefore, for decision making, accounting information is crucial.

Technologies have changed the business operations since late 1980 and focus on a more computerized workplace, and therefore companies are now in the digital age of business (Chartered Global Management Accountant (CGMA), 2013). Enterprise resource planning (ERP), electronic point of sale (EPOS), e-commerce platforms, and other related systems are the processes of collecting data digitally.

Technologies like big data, cloud computing, and artificial intelligence challenge the accounting profession (Danimir, Mirjana, & Ivana, 2019). Digitalization and technology are continuously changing the profession. Therefore, unlike the early days' accountants need to deal with these technologies, and these are embedded in their tasks and duties.

Due to the emergence of big data, now companies are focusing on real time and forward-looking perspective information regarding corporate performance compared to traditional historical accounting information (Chartered Global Management Accountant (CGMA), 2013). Also, it adds value to the organization in many ways, including increasing understanding of organizational activities, increase the quality of accounting information, improving decision making capabilities, and leading to competitive advantage (Younis N. M., 2020). However, limited availability of big data analysts provides issues for the organization. Therefore, organizations are not able to get the required number of analysts and do the analysis. Also, due to big data, companies can improve performance, measure performance, and manage risks due to effective decision making (Herath & Destiny, 2021).

According to the survey, it is found that 51.4% believed automation will impact the company in the coming five years, and tasks like financial reporting, operational accounting, and general ledger activities will be heavily affected due to automation (Gibson & Kaplan, 2020). This indicated that automation has already taken place in most organizations, and most activities are automating.

Due to automation, accountants mentioned that they are highly confident of accounting practices that use automation, and automation leads to cost reductions of financial information (Wilson & Sangster, 1992). This is due to increased accuracy due to lower human interactions.

On the other hand, robotic process automation (RPA) benefits larger firms, those who are providing accounting and auditing services. In here, a large amount of data can be processed on time and with lesser costs since human intervention is limited

(Lacurezeanu, Tiron-Tudor, & Bresfelean, 2020). Therefore, in the future, organizations will heavily use RPA in their operations.

Integration of AI leads to increased efficiency and accuracy of financial reporting enables strategic decision-making (Odonkor, Kaggwa, Uwaoma, Hassan, & Farayola, 2024). However, lack of trained staff, resistance to change, privacy concerns, and high implementation costs are barriers to AI integration in accounting practices. On the other hand, considering the future aspects, organizations are not in a position to avoid integrating AI when they want to survive in the business context (Emetaram & Uchime, 2021). This shows the importance of AI in business operations in coming years.

In the future, AI will be integrated into accounting by creating trends in advancements in explainable AI, blockchain integration, predictive analytics, preparation of financial statements using AI, cross-functional AI applications, and collaboration with AI service providers (Adeyeri, 2024). Therefore, companies can gain from integrating AI, and it leads to advanced analysis.

In summary, it can be concluded that big data analytics, automation, and AI already embrace accounting practices. Also, it leads to improved decision-making capability and efficiency. Integrating big data analytics, automation, and AI leads to several key benefits to the organization.

However, there are several issues when integrating these technological advancements into accounting practices. Therefore, organizations need to identify those barriers that are unique to their organization and try to remove and get the maximum from big data analytics, automation, and AI.

### **1.2. Research Scope**

This study focuses on assessing the current integration of big data analytics tools, automation systems, and artificial intelligence in selected accounting practices. Also evaluating perceived impacts that arise due to big data analytics tools, automation systems, and artificial intelligence.

The focus here is to check their accuracy, efficiency, and productivity. On the other hand, identify barriers and challenges associated with big data analytics, automation, and AI in selected accounting practices, and finally, produce strategies that can use big data analytics, automation, and AI in selected accounting practices, which increase accuracy and efficiency. A questionnaire, incorporating quantitative questions, and with open ended questions, will be utilized to evaluate the above.

### **1.3. Problem Statement**

Technology has been transforming industries and professions over the years. Accounting and accounting practices are changing due to these technological advancements. Big data analytics, automation, and artificial intelligence have integrated into accounting practices, increasing the level of integration. However, the extent to which these technologies impact the efficiency, accuracy, and productivity of accounting tasks remains unclear. Understanding the implications of technology

adoption in accounting is crucial, and firms can optimize their operations by using big data analytics, automation, and artificial intelligence in selected accounting practices.

#### **1.4. Research Objectives**

These six objectives will be achieved in the study.

- To assess the extent of implementation of big data analytics tools, automation systems, and artificial intelligence in accounting practices.
- To investigate the perceived impact of big data analytics on the efficiency of financial reporting.
- To investigate the perceived impact of automation on the accuracy of financial data and information.
- To investigate the perceived impact of artificial intelligence on the productivity of accounting professionals.
- To identify challenges and barriers associated with the integration of big data analytics, automation, and AI in accounting practices.
- To explore potential strategies for leveraging technology to enhance efficiency, accuracy, and productivity in accounting practices.

#### **1.5. Research Significance**

Technology has drastically changed the world, and accounting practices also affect that. Therefore, it is important to identify the integration of big data analytics, automation, and artificial intelligence into accounting practices. This enables organizations to view their status and understand strategically where they are. On the other hand, understanding status leads to an organization ready for the future and making strategic decisions.

Knowing the perceived impact of big data analytics, automation, and AI leads to identification of efficiency, accuracy, and productivity. Identification of these efficiency, accuracy, and productivity leads organizations to plan their future strategies like investment, training, and development of employees and to forecast further on their strategic direction. This shows the benefits that firms get with these technological advancements.

On the other hand, apart from benefits, it needs to identify the potential barriers and challengers to the adoption of these technological advancements. Knowing those barriers, an organization can produce strategies to overcome those barriers and be ready to maintain its competitive advantage. Also, it can facilitate streamline operations in an efficient way.

Also, by doing this study it can produce strategies to boost the accuracy and efficiency of selected accounting practices. This allows organizations to get the most from big data analytics, automation, and AI. Therefore, it will increase the benefits of implementation. However, this enables organizations to formulate road maps for implementing tools and technologies.

Accountants can identify the benefits from the implementation of these technological advancements and are ready to grab and enhance their career prospects. Organizations can implement these technological advancements into their operations and remain competitive over others.

### **1.6. Outline**

The remainder of the thesis is arranged as follows: Section two is the literature review, which represents an in-depth analysis of past studies and theoretical backgrounds of big data analytics, automation, and AI, the impact of big data analytics, automation, and AI on accounting practices, etc. Section three is research methodology, which shows how data was collected for the research and population, sampling details, with conceptual framework. Section four describes the way that collected data was analyzed and the methods that were used for analysis. Section five described recommendations and conclusions. In here, analyzed data changed into valuable conclusions, and this will be the last section of the thesis.

## 2. LITERATURE REVIEW

In this section, it is analyzed previous studies related to this study and theories that are related to the topic. All these are broadly analyzed and discussed here.

### 2.1. Big Data Analytics

Big data analytics can simply be defined as an advanced analytic technique that is used to analyze big data (Russom, 2011). People use these big data analytics to discover new business facts. Sometimes these new findings companies never knew previously, and to do those, organizations need to have larger data sets. Big data has three characteristics, which are volume, variety, and velocity, which are commonly known as 3Vs (Russom, 2011). In simple terms, volume is the amount or quantity of data. Variety is distinct types of data. Velocity is the rate at which data is created. The below figure further explains the 3Vs.

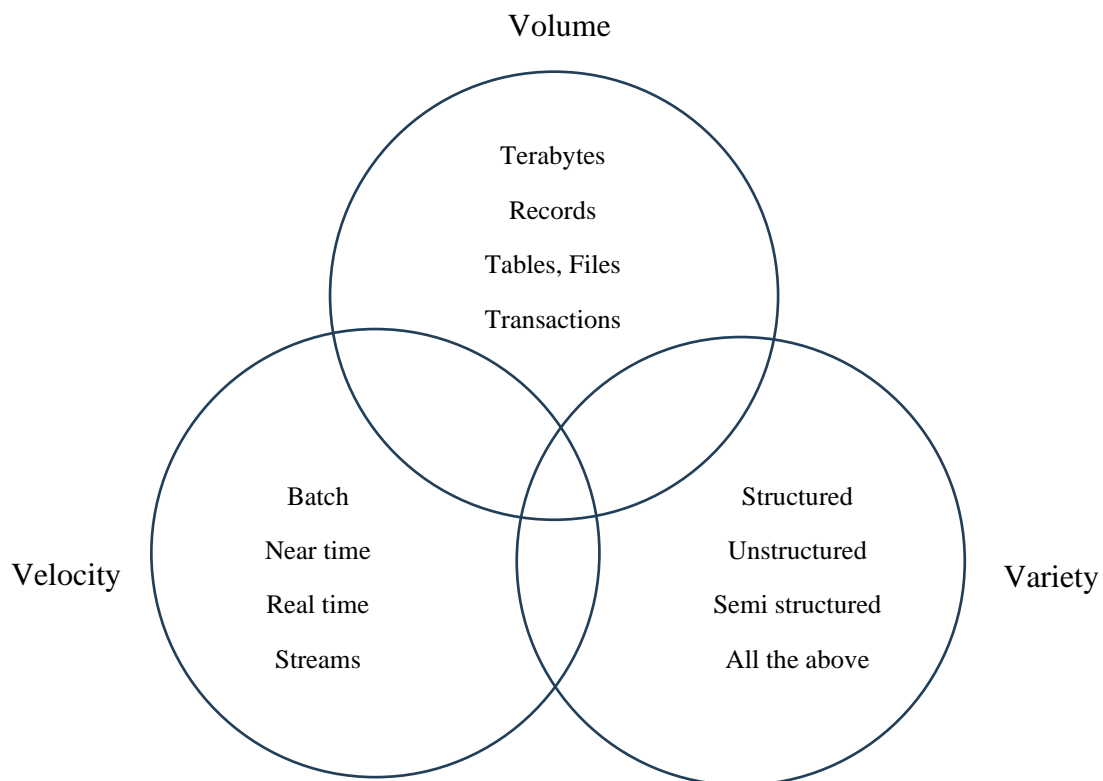


Figure 2.1 – 3Vs of Big Data

Source : Russom, 2011

The simple terms big data are the data that cannot be processed in normal terms and require different methodologies to handle them (Fisher, DeLine, Czerwinski, & Drucker, 2012). In a normal way, data can be put into spreadsheets that are enough for memory; if the data is clean and the values are reasonable, it can run and get the results. If the data sets are large enough, which is difficult to handle via normal memory, the data sets are not clean, and in different forms, it needs to use big data analysis methods to get the required output.

There are four types of big data analytics those are descriptive analytics, predictive analytics, exploratory or discovery analytics and prescriptive analytics (Rajaraman, 2016). Descriptive analytics is past data that are present in an understandable form. These are typically formed into a dashboard. For visualization it uses bar charts, scatter plots, pie charts, maps etc. In predictive analytics it is forecasted data based on currently available data. In here it is used time series statical methods, neural networks, and machine learning. Finding unexpected relationships among different data is known as exploratory or discovery analytics. The focus here is to find these relationships and provide meaningful insights and opportunities. In prescriptive analytics, it shows what to do to achieve a goal. Goal can be a target or business objective.

### **2.1.1. Importance of Big Data and Big Data Analytics**

Big data analytics benefited organizations in many ways. It utilized available data, provided meaningful information, and provided opportunities that were not known (SAS Institute Inc, 2024). Further, it leads to efficient operations, increased profits, and satisfied customers. Also, big data analytics is highly beneficial for firms that use data driven goals, measuring performance using data and analytics (Imene & Imhanzenobe, 2020). Since most organizations collect larger amounts of data, big data analytics are highly effective for their operations. For customer intelligence, supply chain management, and fraud detection, big data analytics are used by organizations across different industries (Elgendy & Elragal, 2014).

On the other hand, in the survey, 65% of respondents say that they know the concept but do not know that terminology is big data (Russom, 2011). This indicates a reasonable level of organizations using big data analytics for their operations without knowing the concept. Meaning big data embraces their businesses, and they need to exact the benefits from big data. Big data will impact the next 5-10 years in a higher way, and only South Asia will be impacted by 77% (Chua, Big data: its power and perils, 2013). This shows the importance of big data in the business context.

### **2.1.2. Challenges and Barriers to Big Data Analytics**

Even though there are many advantages to big data analytics, there are barriers and challenges to implementing big data analytics. A shortage of staff and not having the required skills, a lack of organizational support for big data analytics implementation, and problems with software are the key barriers to big data analytics (Russom, 2011). In the next five years, 80% of surveyed organizations are likely to adopt big data analytics to their operations, and big data analytics becomes the largest net contributor to job creation due to technology enhancements (World Economic Forum, 2023). This shows that the lack of staff is going to be severe in the coming years if the required skilled staff is not on the market. Software issues include older versions of software used by the organization, and there is no support for fast output generations and scalability issues. Handling big data seems difficult; the reason here is to that handling big data requires proper storage, management, integration, federation, cleaning, processing, etc. (Elgendy & Elragal, 2014). On the other hand, when using big data analytics tools, some industries must be concerned about data security and privacy issues (Huttunen , et al., 2019). Having big data analytics in operations organizations needs to ensure their most valuable data security. If not, it will affect the organization in a bigger way.

The cost of hiring staff with big data analytics capabilities seems another issue for organizations and presenting big data analysis to users (Younis N. M., 2020). To attract and retain these employees involves higher costs since there are not enough candidates in the market. However, the velocity nature of big data negatively affects the decision-making process. Since data is changing rapidly, the decision that we make might have a chance of becoming inaccurate. Therefore, having quick available data and information doesn't lead to better decisions. Lack of expertise knowledge about big data and exacting wrong or misleading information leads to creating wrong decisions (Gärtner & Hiebl, 2017).

## **2.2. Automation**

Automation is the full or partially replacement of a function or functions that are carried by humans (Parasuraman, Sheridan, & Wickens, 2000). This replacement was done by computers. Therefore, this can happen at any level.

When it comes to accounting, automation is the replacement of accounting functions from humans. It means computer systems are being used to replace the accounting activities carried out by accountants. Accounting activities like bookkeeping are heavily computerized, and accounting activities that involve high level personal judgment become difficult to automate (Wilson & Sangster, 1992).

When talking about automation, it needs to talk about the RPA, which is going to affect accountants in a higher way (Jędrzejka, 2019). There is a chance that the RPA will take over the accountants' tasks in the future.

### **2.2.1. Importance of Automation**

Automation helps organizations in many ways. Reduced operational costs, reduction of human errors since human intervention becomes limited once automated, increased speed of operations, improved customer satisfaction, and increased scalability of the operations are some key benefits of automation (Jabłoński & Ziębicki, 2019).

According to the survey, 78% of those who use RPA planned to substantially increase their investment in the next three years (Wright, Witherick, & Gordeeva, 2017). Further, it is found that RPA provides payback in less than one year, which is a remarkable return on investment. RPA implementations met or exceeded the expectations of 85% of respondents and provided them with financial benefits of cost reduction and nonfinancial benefits including accuracy, timeliness, flexibility, and improved compliance within the organization.

### **2.2.2. Challenges and Barriers to Automation**

There are a few issues with the automation. Jabłoński & Ziębicki (2019) found those issues, and those are available technologies not compatible with the automation technology. Issues with automation lead to preparing inaccurate financial statements, leading to regulatory issues. Also, being unable to control issues within the automation processes, leads to creating substantial issues since automation continues to do the same, and needs to arrange the change management effectively and needs to establish controls; if not, automation efforts will fail.

Also, automation is always not a cost effective one (Korhonen, Selos, Laine, & Suomala, 2021). This is because even though there is automation technology, some

aspects require human intervention. Without those, it cannot proceed with the task. Even though there are decision making processes with the technology, sometimes it requires expertise to make certain decisions.

### **2.3. Artificial Intelligence**

Artificial Intelligence (AI) can be described as cognitive functions that are performed by a machine and are usually accomplished by human minds (McKinsey & Company, 2023). Therefore, AI can do activities like humans. This leads to replacement for humans. Currently, AI is increasingly expanding and heavily used in marketing and sales, product and service development, strategy and corporate finance. In finance industries, AI is used to detect fraud activities that focus on larger deposits and unusual debit card transactions (Frankenfield, 2023).

#### **2.3.1. Importance of Artificial Intelligence**

AI brings key advantages to the organization, and these are some of the benefits, according to Accenture, (2024). Firstly, increased efficiency, reduced the risk, and reduced downtime and maintenance costs are one of the key advantages. Secondly, due to limited human interaction, it leads to higher accuracy. On the other hand, machines think differently than humans, therefore, due to the use of AI, it can bring new opportunities, products, and services. Also, due to the use of AI it can empower the employees and be able to get the maximum from them. Finally, increased customer service since organizations can use AI, enabled services 24 hours a day. Real time responses enhance customer satisfaction and retention. Leading audit firms like EY and PwC are in the process of developing AI based technology to do more deep auditing activities and financial review activities to give an accurate and complete picture of financials (Marks, 2024).

On the other hand, the big four audit firms, namely PwC, KPMG, Deloitte, and EY, heavily used AI in their operations (Thomson Reuters/Tax & Accounting, 2023). They use AI for predictive analytics, AI powered tools for auditing, AI tools for tax compliances, and for developing client insights.

#### **2.3.2. Challenges and Barriers to AI**

Though there are some challenges associated with AI usage. Weitzman, (2023) outlined some of the challenges below. When the company uses the AI, and if there are mistakes coming from the AI system, it will affect the company in a massive way. Organizations vulnerable to cyber-attacks are another risk associated with AI. Finally, due to inhuman behavior, it can negatively affect the organization. As an example, if the AI powered chatbot fails to understand the human response and if it gives the wrong and insensitive response, it leads to customer dissatisfaction and company goodwill.

### **2.4. Accounting, Accounting Practices and Accountants**

Accounting and accountants are not new concepts to any organization or society. Accounting can be simply identified as recording past data with, managing those, and making important decisions for the benefit of the organization (Lunt, 2008). Therefore, accounting focuses on measurement and management. The main objective of accounting is to provide financial information to its users, like owners, managers, and other interested parties. On the other hand, an accountant is someone who performs

accounting functions, which include account analysis, auditing, or financial statement analysis (Kagen, 2023). Apart from those, some of the things are conducted by accountants when performing their job. Those include risk analysis, working with external auditors, preparing tax returns, ensuring accurate bookkeeping within entities, and ensuring update systems (Thomson Reuters, 2024). All these tasks mentioned above need to be followed by an accountant in traditional terms.

Accounting practices can be described as the process and activity of recording financial transactions that occur on a daily basis (Kenton, 2021). These practices are crucial to producing financial reporting for regulatory bodies and annual financial reports. Therefore, accounting and accounting practices have highly similar concepts. When it comes to accounting, there are several key terminologies that are used, and these are explained in the following.

#### **2.4.1. Financial Accounting**

Financial accounting is recording monetary transactions within established concepts, principles, and accounting standards, following legal requirements, presenting those to users by making financial statements at the end of the period (Lunt, 2008). Therefore, recording and reporting is the primary duty of financial management.

When it comes to profit-oriented organizations, there are four main financial statement, including the balance sheet, income statement, statement of cash flow, and statement of changes in equity (Murphy, 2024). A balance sheet provides a view of the organization's assets, liabilities, and shareholders' equity at the given date. An income statement provides a view of the organization's income and expenses within a period. Cash flow statements provide a view of how cash flows are followed within the given period. A statement of changes in equity shows how shareholders' equities changed within the given period.

#### **2.4.2. Management Accounting**

Management accounting is the process of identification, measuring, accumulation analysis, preparation, interpretation, and communication of information to management to plan, evaluate, and control its resources (Lunt, 2008). Therefore, management accounting focuses on internal reporting. The person who handles the above tasks in an organization is known as a management accountant.

Compared to financial accountant, management accountants follow different tasks. They are preparing reports to internal parties, use both qualitative data and quantitative data, based on future aspects, not past, and analyze data, forecast, and budget for decision makers (Association of International Certified Professional Accountants, 2023).

#### **2.4.3. Auditing**

Examination of financial statements of an organization and presentation of it in the form of an annual report by an independent person (PwC, 2024). In here, financial statements include the balance sheet, income statement, statement of cash flow, statement of changes in equity, and notes to the statements. Due to auditing, readers of financial statements can use those with confidence, and accounting uses high emphasis in auditing (Watkins, 2009). Auditing follows with two phases which are bookkeeping phase, and accounting phase. The Bookkeeping phase is where the auditor ensures that

recorded data and transactions are complete and accurate when transforming into financial statements and accounting phase is where the accounting policies used by the organization is acceptable and shows true and fair view.

There are two types of audits, which are external audit and internal audit. External audit is where an organization hires an external party for auditing, and they provide an opinion about the company's financials. Internal auditors perform audits for the company and provide their report directly to the management (Tuovila, 2023). The main purpose of internal audits is to ensure organization compliance with the standards and ensure accurate and timely financial reporting for the users.

## **2.5. Impact of Big Data, Automation and Artificial Intelligence on Selected Accounting Practices**

Rising of emerging technologies causes to change the lives of millions of accounting professionals, and these technological changes are driven by rapid technological developments, easily accessible internet, and legislative and regulatory changes (Kroon, Alves, & Martins, 2021).

In today's world, organizations must deal with a larger amount of data, and based on those big data technologies, those are able to produce useful forecasts and better decisions (Rybicka, 2018). Now, technologies like big data cannot be taken as recent technology as it already embraces the management accounting field. To deal with these contemporary trends, management accountants need to develop knowledge and skills. Therefore, big data is now changing accounting. As per the above, this indicates management accountants need to learn about technologies like big data to provide more meaningful decisions, and considering the current business environment, this becomes a requirement.

When it comes to some industries, like airline and telecommunications, collect larger amounts of data. Using traditional accounting methods, it takes more time to process and make the decisions. However, if the accountants with big data analytics capabilities lead to creating more valuable information for decision making (Kaya & Akbulut, 2018). Further, having big data analytics eventually leads to creating real time information for decision makers. If the industry becomes more complex, awareness of big data analytics is crucial for decision making, and it also leads to creating a competitive advantage.

However, two thirds of finance professionals believe that to make proper decisions and for performance management, it requires significant improvement in accuracy and reliability (Chartered Global Management Accountant (CGMA), 2013). This indicates that even though an organization embraces the importance of big data, it still needs to properly input and manage the data. If not, having big data analytics capabilities will not be valuable and will create wrong decisions.

On the other hand, in the survey, 86% of finance professionals mentioned that organizations are not able to grab the maximum from data due to data quality issues, as well as professionals not able to deal with non-financial data (Chartered Global Management Accountant (CGMA), 2013). This indicates that current accountants not only deal with available financial data, but also with non-financial data, when it comes to decision making. Using big data analytics can increase the efficiency and

effectiveness of the audit report and lead to a better quality audit report, which minimizes the audit risk (Dagilienė & Klovienė, 2019). However, when it comes to the usage of big data analytics, it seems that larger companies are the ones who heavily use these technologies compared to smaller companies. Further, using big data, analytics can improve forecasting capabilities by adding non-financial information and using real time data which creates prominent advantages (Institute of Chartered Accountants in England and Wales, 2019). Also, using financial information with non-financial information can lead to a better understanding of cost drivers.

Big data analytics leads to making decisions in real time and analyzing the risk in real time (Herath & Destiny, 2021). Financial statements and management reviews are conducted periodically. These can be annually, quarterly, and monthly. However, due to big data analytics, entities can analyze the data in real time and add vast amounts of data and information. Real time financial reporting is one of the key advantages of big data and big data analytics (Rîndașu, 2017). As per the accountant's point of view, this real-time reporting is crucial and must use significant effort affecting their tasks. Therefore, organizations can change their strategies and strategic directions based on those results. Thus, big data analytics drive accountants to proactive and strategic roles in business (Chua, Big data: its power and perils, 2013). Proactive comes to action since accountants are in the process of analyzing data in real time. Therefore, there is no need to wait periodically for performance analysis to make the decisions. On the other hand, real time financial statements lead to changes in auditing practices since reporting happens in real time (Gepp, Linnenluecke, O'Neill, & Smith, 2018). Therefore, new mechanisms need to be planned and implemented in the future to conduct auditing in companies that are practicing real time financials.

Automation is key to reducing the number of employees in the accounting function, and this can reduce the cost significantly (Wilson & Sangster, 1992). Some tasks are easy to automate, and some tasks are not. When the task is easy to automate, a person in that field has a high chance of losing the job. Though automation is an older concept, it is found that a considerable number of tasks still conducted by accounting departments are manual (Gibson & Kaplan, 2020). This indicated that even though there are benefits, there are key issues with automation technologies. If not, why is the process manual. When it considers some organizations, it shows that they are in future to invest highly in automation technologies in budgeting, forecasting, and reporting tools. Due to automation, some areas lead to fewer accountants; however, due to that, some areas require more accountants since automated tasks need to be controlled and developed (Korhonen, Selos, Laine, & Suomala, 2021). Therefore, sometimes it does not meet the expected cost benefit. However, integrating automation into accounting results in enhanced decision making capabilities and better management (Wilson & Sangster, 1992).

When it comes to automation, Robotic Process Automation (RPA) is another branch of automation. As the name suggests, RPA is the replacing accountants and use of robots for their tasks and duties. When it comes to automation, RPA has several key advantages in accounting practices, which include increased accuracy, lower cost, and reducing the negative aspects of repetitive tasks (Jędrzejka, 2019). RPA is heavily used in areas like managing receivables and payables, updating customer-related data,

issuing invoices, etc. (Lacurezeanu, Tiron-Tudor, & Bresfelean, 2020). Also, using RPA in these processes will lead to higher efficiency.

In the auditing process, RPA makes significant improvements, including error free works that leads to higher quality data, enhanced reporting, and lesser downtime error corrections (Moffitt, Rozario, & Vasarhelyi, 2018). On the other hand, when the robot always operates within the given scope, it is always more trustworthy compared to humans, and due to this nature. Also, it can audit robots easily compared to humans. Therefore, in future audits, robots can be heavily used in the accounting area.

Using AI, accountants can minimize the possibility of fraudulent activities. When it comes to small and medium-sized organizations, people in the finance department have access to all the data and therefore have a high chance of fraud (Chukwuani & Modesta Amaka, 2020). However, using AI, can limit access since AI performs larger activities in accounting and few people need to input data to the system.

In a company point of view, using AI in accounting functions has several key benefits. These include cost reduction due to lower-level employees and an increase in the efficiency of and accuracy of financial reporting (Bose, Dey, & Bhattacharjee, 2022). Further AI based software will handle more complicated operations efficiently compared to accounting staff (Li & Zheng, 2018). Also, there are several costs associated with the AI, including costs of design, development, and implementation, and monitoring. On the other hand, in each organization, all people in finance and auditing need to have matching experience related to the business process, however, AI does not require this, and it can work with any business environment (Chukwuani & Modesta Amaka, 2020).

Also, accounting firms are currently using AI in their workflows and have benefited in time savings, increased customer service, and increased scalability (Thomson Reuters/Tax & Accounting, 2023). Due to AI, it can automate activities like data entry and reconciliations. Using AI, accountants can provide more data driven and proactive advice to the customers, leading to stronger relationships. Also, accountants can provide their services to a larger customer base without significantly increasing their workforce.

Further, AI facilitates real time financials, leads to cost savings, and increases the scalability of operations (Adeyeri, 2024). Integrating AI with accounting and auditing results in optimizing the setting of accounting posts, structure layout, and effect on traditional and practical working modes (Das, 2021). However, AI is still new to the accounting field, and there are limitations. Those are, if the feeding data is inaccurate, incomplete, or biased, it can result in inaccurate information for decision making.

In the coming decades, AI will increasingly make decisions that are currently done by humans, and accountants who are familiar with technology will provide more value to the business (Berdiyeva, Islam, & Saedi, 2021). This trend will boost the company standards and investment decisions, eventually transforming the accounting profession in the next ten years.

Further, AI will be replaced mostly by routine accounting tasks, and AI systems cannot fully replace humans since those are not with human creativity and imagination

(Mohammad, et al., 2020). On the other hand, heavy use of AI will lead to increased security issues, hence, organizations need decisions that are coming from humans as well. Even though there are many security advantages with the IT base integrations, there is fear of failure or collapse of the entire system (Mohammad, et al., 2020).

On the other hand, integrating AI into accounting can create issues like integration with legacy systems, skill gaps with the current accounting context, lack of training, regulatory compliance, cost considerations, and change management (Adeyeri, 2024). By developing integrating capabilities, increasing cyber security measures, enhancing training on AI, conducting cost benefit analysis, and developing a culture that is innovative and collaborative, can overcome these challenges.

Big data analytics, automation, and AI are already integrated into accounting practices, and accountants need to come up with strategies to make use of these technologies in their tasks and duties. By doing this, it can bring remarkable benefits to the organization. On the other hand, there are several issues when integrating these technologies in accounting practices. Therefore, organizations need to identify issues when integrating big data analytics, automation, and AI into accounting practices and come up with strategies to overcome these challenges.

### **3. RESEARCH METHODOLOGY**

This chapter discusses how the research is measured. In this chapter, it explains the population, sample selection, and methodology of sample selection. Further, this chapter shows the conceptual framework for the study. Finally, developed hypotheses as well as data collection methods are mentioned.

#### **3.1. Research Problem**

In today's world, technology has impacted every corner of the world. When it comes to accounting, accounting practices have impacted in several ways. Big data analytics, automation, and AI have changed traditional accounting practices and keep changing the accounting practices.

However, how these big data analytics, automation, and AI impacted the efficiency, accuracy, and productivity of accounting practices is unclear. These technologies sometimes have a significant impact on accounting practices and sometimes not due to issues. Therefore, due to the dynamic environment, organizations need to identify the impact from these technologies to their accounting practices and based on that, be able to maximize adoption of these technologies and optimize the usage of these technologies. On the other hand, there are challenges in adopting these technologies into operations. Therefore, identifying the barriers and challenges helps organizations come up with strategies to use big data analytics tools, automation, and AI in accounting practices.

#### **3.2. Research Design**

This study adopts a quantitative approach as its primary method, focusing on the collection and analysis of numerical data to quantify the impact of technological advancements on selected accounting practices. However, to gain more detailed insights and understanding of the accounting professionals, open-ended questions are also included in the questionnaire.

A quantitative approach is suited for the study to achieve objectives. Due to the quantitative approach, it can collect data from a larger sample, which gives a better understanding of the population.

#### **3.3. Research Method**

In the study it is going to achieve six objectives. Those are,

- To assess the extent of implementation of big data analytics tools, automation systems, and artificial intelligence in accounting practices.
- To investigate the perceived impact of big data analytics on the efficiency of financial reporting.
- To investigate the perceived impact of automation on the accuracy of financial data and information.
- To investigate the perceived impact of artificial intelligence on the productivity of accounting professionals.
- To identify challenges and barriers associated with the integration of big data analytics, automation, and AI in accounting practices.

- To explore potential strategies for leveraging technology to enhance efficiency, accuracy, and productivity in accounting practices.

### 3.3.1. Conceptual Framework

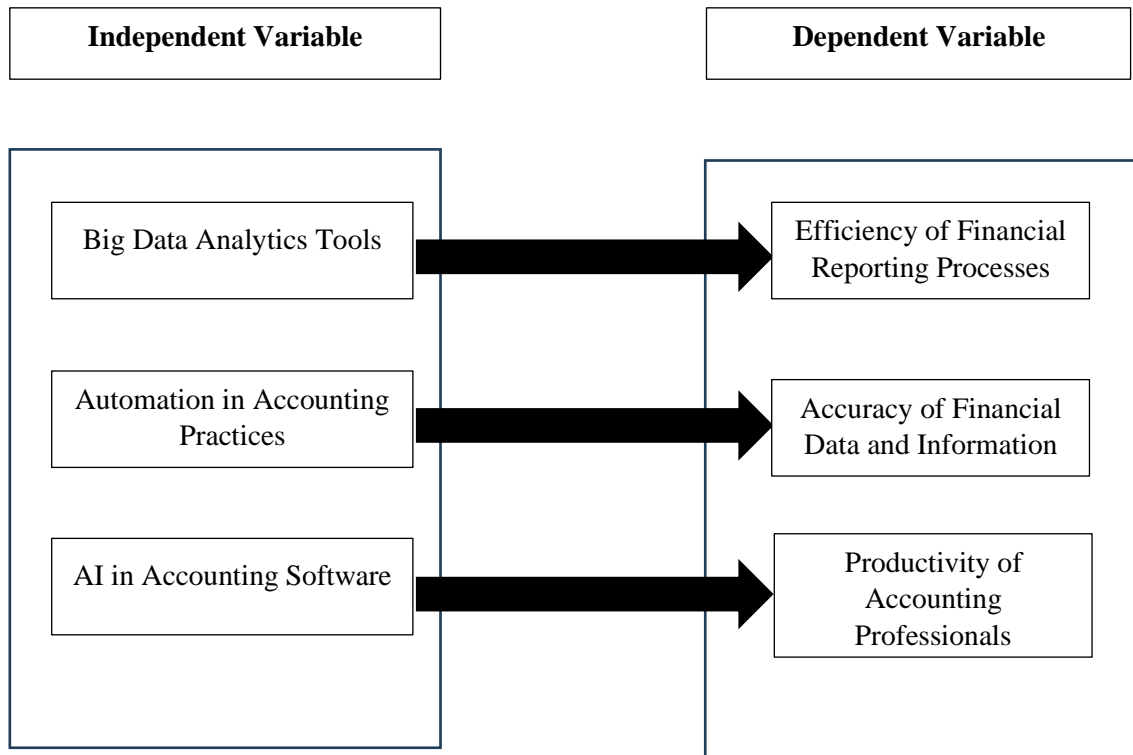


Figure 3.1 – Conceptual Framework

### 3.3.2. Hypothesis

Based on conceptualization model below hypothesis developed for achievement of objective 02, objective 03 and objective 04.

**H<sub>0</sub>:** Implementation of big data analytics tools does not significantly enhance the efficiency of financial reporting processes.

**H<sub>1</sub>:** Implementation of big data analytics tools significantly enhances the efficiency of financial reporting processes.

**H<sub>0</sub>:** Introduction of automation in accounting practices does not lead to significant changes in the accuracy of financial data and information.

**H<sub>1</sub>:** Introduction of automation in accounting practices leads to significant changes in the accuracy of financial data and information.

**H<sub>0</sub>:** Integration of artificial intelligence into accounting software does not result in increased productivity among accounting professionals.

**H<sub>1</sub>:** Integration of artificial intelligence into accounting software leads to increased productivity among accounting professionals.

### 3.4. Data Collection

For the study both primary and secondary data were used.

#### 3.4.1. Primary Data Collection

Primary data collected using questionnaires and it consists of four parts. Part A consists of general information of the respondents, including age, gender, and work experience. Part B consists of implementation of technological tools in current accounting practices. Part C is checking how these big data analytics, automation, and AI impact on efficiency and accuracy of accounting practices. Part D consists of questions related to challenges and barriers which arise from technology use and focuses on strategies used to overcome them. Part C consists of questions which are used to test the hypothesis. In here questions are prepared using five-point Likert scale.

Below shows the five-point Likert scale question types are used.

- |                             |                               |                        |
|-----------------------------|-------------------------------|------------------------|
| 1. Significantly improved.  | 1. Strongly agree.            | 1. Very confident      |
| 2. Somewhat improved        | 2. Agree                      | 2. Somewhat confident  |
| 3. No change                | 3. Neither agree nor disagree | 3. Neutral             |
| 4. Somewhat decreased       | 4. Disagree                   | 4. Somewhat concerned. |
| 5. Significantly decreased. | 5. Strongly disagree.         | 5. Very concerned      |

- |                               |                             |
|-------------------------------|-----------------------------|
| 1. Strongly agree.            | 1. Significantly increased. |
| 2. Agree                      | 2. Somewhat increased       |
| 3. Neither agree nor disagree | 3. No change                |
| 4. Disagree                   | 4. Somewhat decreased       |
| 5. Strongly disagree.         | 5. Significantly decreased. |

#### 3.4.2. Secondary Data Collection

Secondary data was collected through journal articles, websites, books, conference proceedings, and published reports.

### 3.5. Population and Sample Selection

#### 3.5.1. Population

For the study, it is used members and part qualified accounting professionals of the institute of chartered accountants of Sri Lanka (CA Sri Lanka) and the chartered institute of management accountants (CIMA-UK). In here it is considered professionals those who are currently working in Sri Lanka.

CA Sri Lanka currently has more than 6000 members and over 30,000 students (CA Sri Lanka, 2024). Also, CA Sri Lanka is the national professional accounting organization in Sri Lanka.

The Chartered institute of management accountants (CIMA-UK) operates in Sri Lanka, and it is another well-known accounting professional body. As per Mr. Kith

Perera, who is an associate specialist at CIMA Sri Lanka, says, it currently has 4,000 members and 10,000 students.

Therefore, the entire population can be determined as 50,000.

### **3.5.2. Sample Size and Sampling Strategy**

In this study, a convenient sampling method was used to select participants from the population. Using the Morgan calculation, the sample size calculated with 95% confidence and with 5% margin of error, 382 full members and part qualified students who practice accounting activities in Sri Lankan organizations were selected as the sample for the study.

However, it received 384 respondents. For sample calculations, it is used Morgan calculation with 95% confidence and with 5% margin of error. Due to this change, the confidence level increases to 95.08% and the margin of error increases to 5.02%. Therefore, it can be concluded that this respondent change does not highly affect the confidence level, margin of error, and it is negligible, which is the minimum impact.

### **3.5.3. Biases of the Sample Chosen**

There are several biases in the sample. In here it is selected CA and CIMA-UK members and students those who have accounting experience for the study. Therefore, it does not capture the accounting professionals; those are from other educational backgrounds and other professional bodies.

On the other hand, it is selected full members and part qualified students. When it considers the experience level, those are different levels of experience. Full members have higher experience and deeper understanding, and part qualified members have lower experience, and some might be still learning some aspects of the accounting. Therefore, this experience difference leads to differences in results.

Further, some professionals might have a higher understanding of these technologies, and some might have a lower understanding. Therefore, those who have a higher understanding of these technologies will give more detailed information, while others do not. Therefore, there are biases.

In here it is used a convenient sampling strategy; therefore, from 382 samples, it might not fully represent the 50,000 population. Due to that, findings may not accurately reflect the broader population of accounting professionals in Sri Lanka.

## **3.6. Data Analysis Procedures**

### **3.6.1. Cronbach's Alpha Reliability Test**

Cronbach's alpha reliability test used to test was the reliability in Part C of the questionnaire. Using Cronbach's alpha reliability statistical tool, it can measure the internal consistency or reliability of a set of scales or test items. Generally, the test will be significant when the alpha value comes to more than 0.7. Furthermore, the results closer to 1 indicate higher reliability.

### **3.6.2. One Sample T Test**

For testing hypothesis, one sample T Test was used. In here it is going to check if the response differs from a specific value. In here it is used value as 3 (Middle point of

Lickert scale questions) to check whether responses significantly different from the middle value of the scale (which is 3).

If more respondents use their responses as 4 or 5, the mean will be more than 3. Therefore, if the mean is significant from 3 indicating agreement, improvement, confidence, or increment. Therefore, if the P-value is less than 0.05, it concludes that accepting the alternative hypothesis. If the P-value is greater than 0.05 indicates rejection of the alternative hypothesis and acceptance of the null hypothesis. If P-value is exactly 0.05, it is an indication of neutrality.

### **3.6.3. Tools and Software Used for Analysis**

For the analysis of data, IBM SPSS Statistics 23 and Microsoft Excel were used.

### **3.7. Ethical Considerations**

Below are the key ethical considerations considered when collecting data using the questionnaire.

It clearly conveys the purpose and procedure of the study to the participants. Consent was obtained voluntarily to answer the questionnaire. Results are obtained without collecting confidential information from the participant. Further, data collected, such as age, gender, and work experience, are collected anonymously. Data is stored securely and is only accessible to analyzed personnel. Questionnaire designed to avoid any kind of psychological discomfort or stress for the participant.

Also, the study was conducted with the utmost honesty and integrity. Data was collected and reported accurately. Further, findings were presented without manipulation. Data that are collected using secondary sources are properly cited. Finally, any kind of conflicts of interest were not identified during the study to avoid any kind of bias that could arise from personal or financial interests.

## 4. DATA ANALYSIS

In this section it analyses the collected data based on questionnaire which is distributed. In this study, there are six objectives set and those are evaluated based on collected data. Collected data analyses using varies methods like graphical representations, descriptive statistics, and one sample T Test.

### 4.1. Cronbach's alpha Reliability

Reliability checked using the Cronbach's alpha reliability test. It is received below results.

Table 4.1: Cronbach's alpha reliability Test Results

		N	%
Cases	Valid	384	100.0
	Excluded <sup>a</sup>	0	.0
	Total	384	100.0

a. Listwise deletion based on all variables in the procedure.

Source: Questionnaire

Table 4.2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.755	.765	6

Source: Questionnaire

Since it received more than 0.7 value it can conclude that questionnaire was acceptable for internal consistency reliability.

### 4.2. Descriptive Analysis

#### 4.2.1. Graphical Representation

There are 384 responses received and analyses using several methods. Of the 384 participants, 126 (35.4%) were from the 31-35 age category and 2<sup>nd</sup> highest from 26-30 (27.3%) years age category which are 105 respondents.

When it comes to gender 208 respondents are females which representing 54.2% and 173 are from males.

In working experience analysis, the highest is from 6–10-year category. There are 144 respondents with 37.5%. 1-5 years' experience professionals are amounted 116 (30.2%).

Table 4.3: Age Analysis

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 21 – 25 years	72	18.8	18.8	18.8
26 – 30 years	105	27.3	27.3	46.1
31 – 35 years	136	35.4	35.4	81.5
Above 36 years	69	18.0	18.0	99.5
Less than 20 years	2	.5	.5	100.0
Total	384	100.0	100.0	

Source: Questionnaire

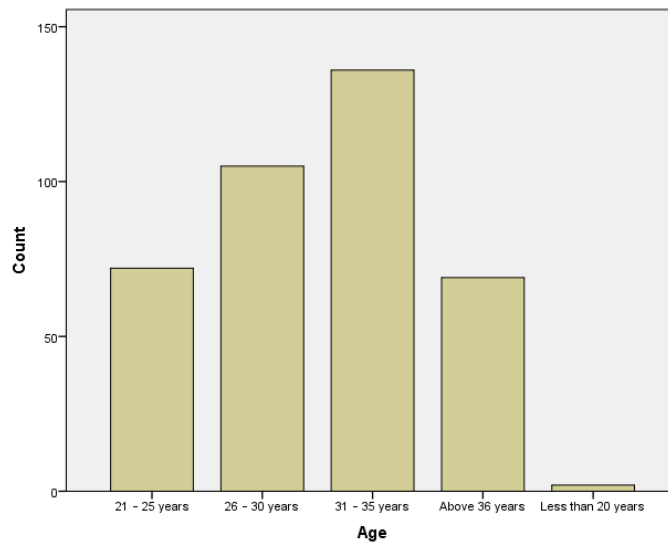


Figure 4.1: Age Analysis

Above table and graph show analysis of age of respondents.

Table 4.4: Gender Analysis

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Female	208	54.2	54.2	54.2
Male	173	45.1	45.1	99.2
Prefer not to say	3	.8	.8	100.0
Total	384	100.0	100.0	

Source: Questionnaire

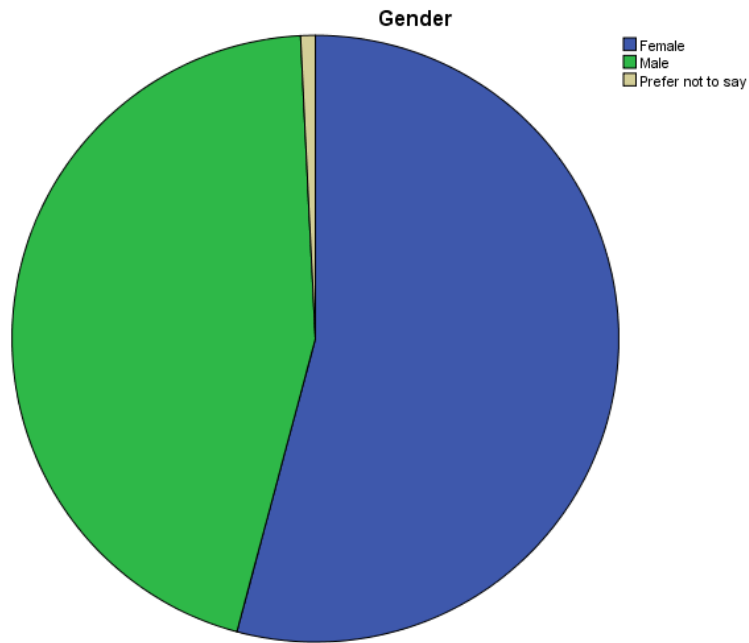


Figure 4.3: Gender Analysis

Table 4.5 and figure 4.2 show the gender analysis of the respondents.

Table 4.5: Years of working experience in accounting

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1 – 5 years	116	30.2	30.2	30.2
6 – 10 years	144	37.5	37.5	67.7
Above 10 years	97	25.3	25.3	93.0
Less than 1 year	27	7.0	7.0	100.0
<b>Total</b>	<b>384</b>	<b>100.0</b>	<b>100.0</b>	

Source: Questionnaire

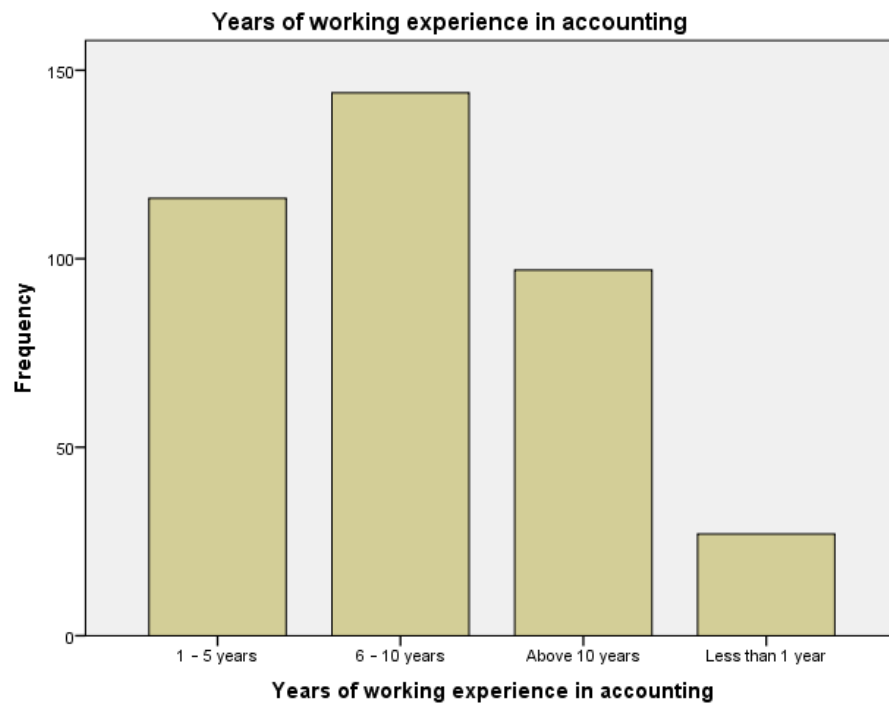


Figure 4.5: Working Experience Analysis

Table 4.6 and figure 4.3 represent the working experience of accounting professionals.

The above graphical representation is mainly used for basic analysis of respondents.

Using the questions below, it is going to achieve objective 01 which is to assess the extent of implementation of big data analytics tools, automation systems, and artificial intelligence in accounting practices.

Table 4.6: Do you currently utilize big data analytics tools for accounting tasks?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	278	72.4	72.4	72.4
	Yes	106	27.6	27.6	100.0
	Total	384	100.0	100.0	

Source: Questionnaire

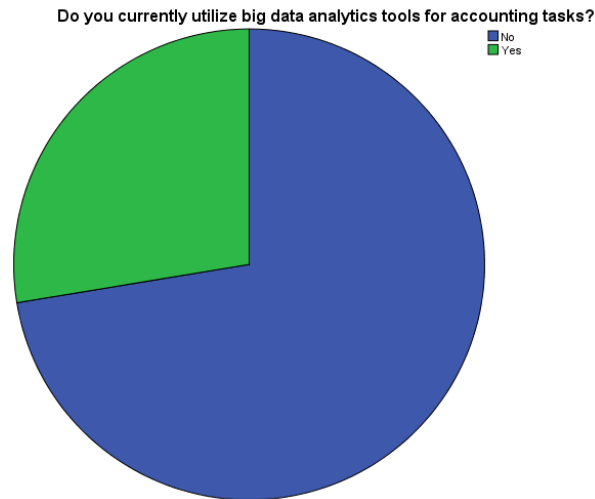


Figure 4.4: Utilization of Big Data Analytics

According to the above 278 respondents, 27.6% say that they are using big data analytics in accounting practices. Meaning 72.4% respondents do not use big data analytics in accounting practices. Therefore, most respondents do not use big data analytics.

According to the question, the purpose of using big data analytics is got below response.

Table 4.7: Purpose of using big data analytics

Purpose of using big data analytics	Count
Data visualization and reporting	79
Fraud detection and risk management	39
Trend analysis and forecasting	38
Other	0
Missing	1
	157

Source: Questionnaire

According to the above responses most of the respondents use big data analytics tools for data visualization and reporting purposes it amounts to 79. 2<sup>nd</sup> highest respondents coming from fraud detection and risk management area which amount to 39. Further, there are 22 respondents used big data analytics tools for data visualization and reporting, fraud detection and risk management, and for trend analysis and forecasting. This question allows respondents to select multiple answers.

Table 4.8: Reasons for not using big data analytics tools

	Count
Lack of awareness about benefits	111
Cost and resource limitations	100

Data security concerns	83
Lack of skilled personnel	201
Missing	6
Other	0
	501

Source: Questionnaire

According to the above, the biggest issue with not using big data analytics is lack of skilled personnel and it is amounted to 201 responses. Cost and resource limitations and lack of awareness about benefits are the other key issues that are the reasons for not using big data analytics tools for accounting practices. This question allows respondents to select multiple answers.

Table 4.9: Does your practice utilize any automated accounting systems (e.g., accounts payable/receivable automation, robotic process automation)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	6.5	6.5	6.5
	Yes	359	93.5	93.5	100.0
	Total	384	100.0	100.0	

Source: Questionnaire

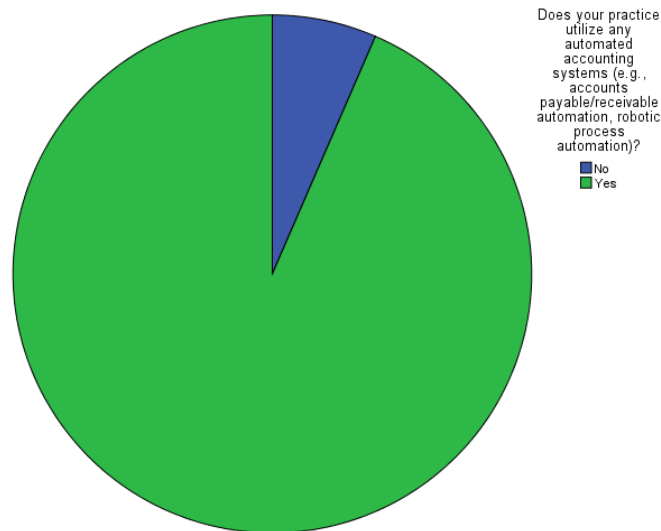


Figure 4.5: Utilization of Automation Systems

According to the above most accounting professionals use automation systems in accounting practices. As per data, 359 respondents, which is 93.5% use automation.

Table 4.10: Automated accounting practices

	Count
Data entry and reconciliation	210
Invoice processing	322
Transaction coding and classification	141
Tax calculations	86
Missing	0
Other	0
	759

Source: Questionnaire

According to the above responses invoice processing is the most commonly used automated accounting practice. For that it is with 322 respondents. For data entry and reconciliation, it received 210 respondents and for transaction coding and classification it received 141 respondents. 17 respondents mentioned that they are practicing all these accounting practices with automation systems. It amounted to 4.43%. This question allows respondents to select multiple answers.

Table 4.11: Reasons for not using Automation

	Count
Data entry and quality issues in entry level	2
Integration challenges with existing systems	9
Implementation costs	19
Lack of trust in automation accuracy	1
Missing	0
Other	0
	31

Source: Questionnaire

Above it shows the answers for not using automated systems and the most common answer is implementation costs. For that reason, it received 21 responses.

Table 4.12: Does your practice use any accounting software integrated with AI functionalities?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	344	89.6	89.6	89.6
	Yes	40	10.4	10.4	100.0

Total	384	100.0	100.0
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Source: Questionnaire

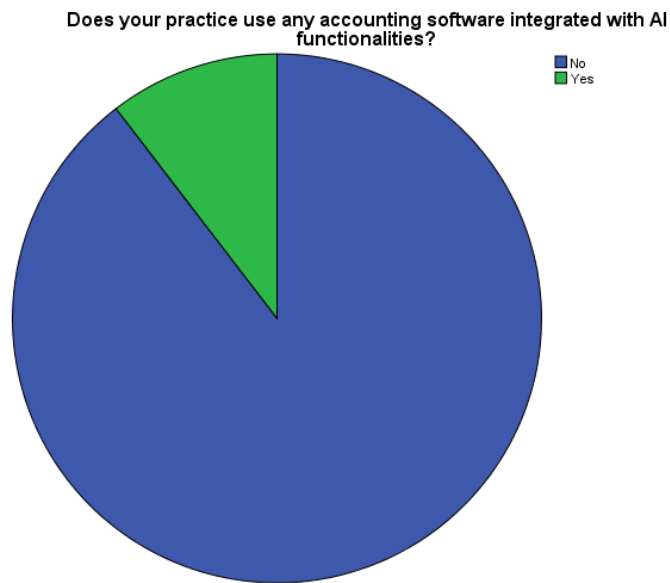


Figure 4.6: Utilization of AI integrated software

As per survey, most respondents are not using AI integrated software in their accounting practices. Only 40 (10.4%) respondents said that they use AI integrated software in accounting practices.

Table 4.13: Usage of AI functionalities in accounting practices

	Count
Fraud prediction and auditing tasks	8
Automated bookkeeping tasks	17
Automated reconciliation tasks	6
Predictive analytics for financial decisions	25
Missing	0
Other	0
	56

Source: Questionnaire

According to the above responses, most of the respondents are using AI for predictive analytics for financial decisions. It amounted to 25. The 2nd highest responses are from

automated bookkeeping tasks. Which amounted to 17. This question allows respondents to select multiple answers.

Table 4.14: Reasons for not using AI functionalities in accounting practices

	Count
High upfront investment costs	230
Ethical concerns about AI	21
Transparency and explainability limitations	78
Lack of training and expertise	281
Missing	9
Other	0
	619

Source: Questionnaire

Most respondents mentioned that the main issue to not using AI is the lack of training and expertise. Secondly most responses received were due to high upfront investment costs, which amounted to 230. These seem to be the main issues of not using AI in accounting practices. This question allows respondents to select multiple answers.

Table 4.15: How extensively are big data analytics, automation, and artificial intelligence tools implemented in accounting practices in your organization?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.0	12	3.1	3.1	3.1
	2.0	216	56.3	56.3	59.4
	3.0	82	21.4	21.4	80.7
	4.0	63	16.4	16.4	97.1
	5.0	11	2.9	2.9	100.0
	Total	384	100.0	100.0	

Source: Questionnaire

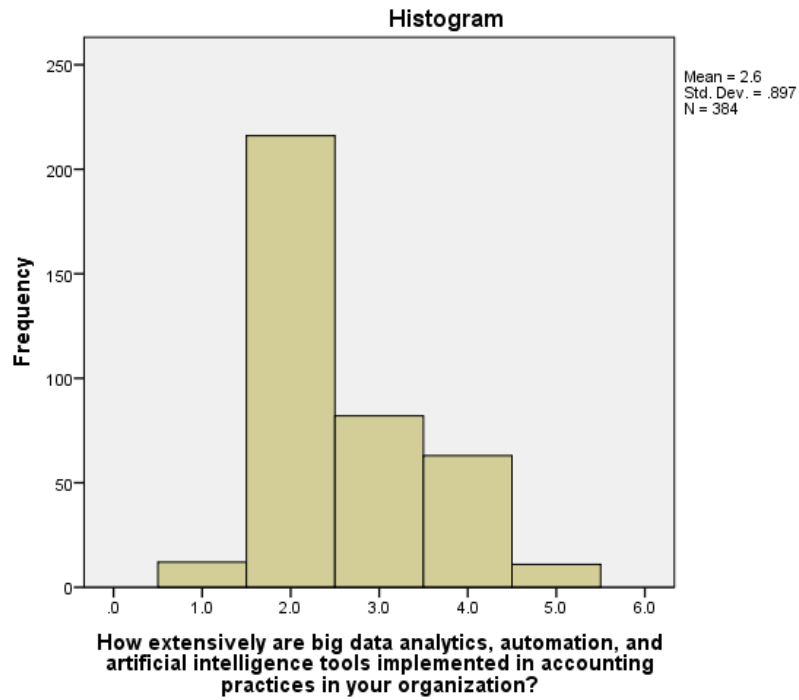


Figure 4.7: Usage of big data analytics, automation, and AI

As per the above table and figure most of the organizations do not heavily incorporate these big data analytics, automation, and AI into their accounting practices. According to graph most of the professionals rated their preference as 2 which is amounted to 56.3%. Further, mean indicated as 2.6, which is lower usage of technological advancements.

#### 4.2.2. Descriptive Statistics

Table 4.16: Descriptive Statistics

	N	Mean	Std. Deviation	Variance
To what extent has/will the implementation of big data analytics tools improved/improve the efficiency of financial reporting processes?	384	3.893	.5471	.299

The use of big data analytics has/will reduced/reduce the amount of time required to complete financial reports	384	3.971	.5178	.268
How confident are you in the accuracy of financial data and information processed through automated accounting systems?	384	4.130	.4941	.244
Has/Will automating accounting tasks reduced/reduce errors in financial data and information?	384	4.409	.5977	.357
How/Will the use of AI-integrated accounting software impacted/impact the productivity of accounting professionals?	384	3.521	.6419	.412
The use of AI in accounting tasks has/will freed/free up accounting professionals' time to focus on more complex accounting activities?	384	3.870	.5539	.307
Valid N (listwise)	384			

Source: Questionnaire

According to the above descriptive statistics, big data analytics has improved the efficiency of the financial reporting process and reduced the amount of time required to complete financial reports. Both means are more than 3.8 which indicates most of the respondents are in support for “improved” and “agree” terms.

When it comes to accuracy of automation, most of the respondents mentioned that they are confident with the data and information received via automated systems. Therefore, the mean of the data is 4.130. On the other hand, most of them also response that the introduction of automated systems leads to reduced errors in financial data and information. Therefore, the mean leads to 4.409.

Further, for the question use of AI-integrated accounting software impacted/impact the productivity of accounting professionals received positive results. Meaning AI integrated software leads to increased productivity among accounting professionals. In here mean indicate as 3.521. Also, use of AI leads to free up the accountants and lead them to focus them on more complex accounting activities. In here, it is received that 3.870 mean from the results. For all questions mean values comes more than 3.

For these questions, it is enabled to write answers which elaborate the answers. However, lower responses are received. In the big data analytics section most respondents said that they are increasing the efficiency of financial reporting. In the automation section most, respondents mentioned that automation increases accuracy and leads to lower errors. Also, AI section it is also received lower responses. Few respondents believe that AI will increase the productivity of accounting professionals. A few others mentioned that they had no idea about this.

### 4.3. Hypothesis Testing

**H<sub>0</sub>:** Implementation of big data analytics tools does not significantly enhance the efficiency of financial reporting processes.

**H<sub>1</sub>:** Implementation of big data analytics tools significantly enhances the efficiency of financial reporting processes.

#### 4.3.1. One Sample T-Test Results – Objective 02

Table 4.17: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
To what extent has/will the implementation of big data analytics tools improved/improve the efficiency of financial reporting processes?	384	3.893	.5471	.0279

Source: Questionnaire

Table 4.18: One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
To what extent has/will the implementation of big data analytics tools improved/improve the efficiency of financial reporting processes?	31.996	383	.000	.8932	.838	.948

Source: Questionnaire

In here Sig. (2-tailed) comes as 0.000 which indicates P-Value less than 0.05. Therefore, this indicates implementation of big data analytics tools significantly improving the efficiency of financial reporting process.

Table 4.19: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The use of big data analytics has/will reduced/reduce the amount of time required to complete financial reports	384	3.971	.5178	.0264

Source: Questionnaire

Table 4.20 One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper

The use of big data analytics has/will reduced/reduce the amount of time required to complete financial reports	36.761	383	.000	.9714	.919	1.023
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Source: Questionnaire

Here Sig. (2-tailed) comes as 0.000, which indicates P-Value less than 0.05. This indicates that the use of big data analytics reduces the amount of time required to complete financial reports.

Since it is received P-Value less than 0.05 it can conclude that implementation of big data analytics tools significantly enhances the efficiency of financial reporting processes.

Therefore, it can reject the  $H_0$  hypothesis and accept the  $H_1$  hypothesis.

#### 4.3.2. One Sample T-Test Results – Objective 03

In here is going to check below hypothesis.

$H_0$ : Introduction of automation in accounting practices does not lead to significant changes in the accuracy of financial data and information.

$H_1$ : Introduction of automation in accounting practices leads to significant changes in the accuracy of financial data and information.

Table 4.21: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How confident are you in the accuracy of financial data and information processed through automated accounting systems?	384	4.130	.4941	.0252

Source: Questionnaire

Table 4.22: One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
How confident are you in the accuracy of financial data and information processed through automated accounting systems?	44.827	383	.000	1.1302	1.081	1.180

Source: Questionnaire

In here Sig. (2-tailed) comes as 0.000 which indicates P-Value less than 0.05. Therefore, this indicates respondents significantly confident of financial data and information processed through automated accounting systems.

Table 4.23: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Has/Will automating accounting tasks reduced/reduce errors in financial data and information?	384	4.409	.5977	.0305

Source: Questionnaire

Table 4.24: One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Has/Will automating accounting tasks reduced/reduce errors in financial data and information?	46.193	383	.000	1.4089	1.349	1.469

Source: Questionnaire

In here Sig. (2-tailed) comes as 0.000 which indicates P-Value less than 0.05. This shows that automating accounting tasks reducing errors in financial data and information is significant.

Since it is received P-Value less than 0.05 it can conclude that introduction of automation in accounting practices leads to significant changes in the accuracy of financial data and information. Reduction in errors is significant means that automation leads to higher accuracy in financial data and information.

Therefore, it can reject the  $H_0$  hypothesis and accept the  $H_1$  hypothesis.

#### 4.3.3. One Sample T-Test Results – Objective 04

In here is going to check below hypothesis.

$H_0$ : Integration of artificial intelligence into accounting software does not result in increased productivity among accounting professionals.

$H_1$ : Integration of artificial intelligence into accounting software leads to increased productivity among accounting professionals.

Table 4.25: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How/Will the use of AI-integrated accounting software impacted/impact the productivity of accounting professionals?	384	3.521	.6419	.0328

Source: Questionnaire

Table 4.26: One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
How/Will the use of AI-integrated accounting software impacted/impact the productivity of accounting professionals?	15.899	383	.000	.5208	.456	.585

Source: Questionnaire

In here Sig. (2-tailed) comes as 0.000 which indicates P-Value less than 0.05. Therefore, this indicates that AI integrated software leads to increased productivity of accounting professionals is significant.

Table 4.27: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The use of AI in accounting tasks has/will freed/free up accounting professionals' time to focus on more complex accounting activities?	384	3.870	.5539	.0283

Source: Questionnaire

Table 4.28: One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The use of AI in accounting tasks has/will freed/free up accounting professionals' time to focus on more complex accounting activities?	30.774	383	.000	.8698	.814	.925

Source: Questionnaire

In here Sig. (2-tailed) comes as 0.000 which indicates P-Value less than 0.05. This indicates that the use of AI in accounting tasks free up accounting professionals' time to focus on more complex accounting activities is significant.

Since it is received P-Value less than 0.05 it can conclude that integration of artificial intelligence into accounting software leads to increased productivity among accounting professionals.

Therefore, it can reject the **H<sub>0</sub>** hypothesis and accept the **H<sub>1</sub>** hypothesis.

#### 4.4. Analysis of Challenges and Strategies

In here is analyze respondents received to Part D in questionnaire.

Table 4.29: What are the biggest challenges your accounting practice faces in integrating big data analytics, automation, and AI into accounting tasks?

	Count
Data quality and standardization issues	197
Cybersecurity threats and data privacy concerns	69
Change management and user resistance	289
Lack of technical skills and expertise	286
Missing	0
Other - Senior management support	1
	842

Source: Questionnaire

For the above question highest answers are from data quality and standardization issues, change management and user resistance, and lack of technical skills and expertise. This question allows respondents to select multiple answers.

Table 4.30: Have you encountered any resistance from accounting professionals towards the adoption of these technologies (big data analytics, automation, and artificial intelligence)

	Count
Yes	89
No	133
Missing	162
	384

Source: Questionnaire

In here, most of the respondents do not clearly answer the question, meaning they are skipping the question. That amounted to 162. From the received responses 89 said that they experienced resistance from accounting professionals. From yes/no answers it amounts to 40.09%. From these “Yes” answers, most of them say the reason for this is due to lower IT knowledge of these technologies. Also, some have mentioned that some professionals think these leads to loss of their jobs. Therefore, they are resisting. Few are mentioned that some professionals resisting these saying implementation of these will not get the required output. They believe that these investments become useless since there are not enough resources to get the required benefits. Looking at the data it seems the main issues for resistance are lack of training and resources to deal with these technologies.

Table 4.31: What strategies can be most effective for leveraging big data analytics, automation, and artificial intelligence to enhance efficiency and accuracy in accounting practices?

	Count
Investing in training and development of accounting professionals	325
Implementing robust data governance frameworks	105
Partnering with technology vendors for support	242
Standardizing data formats and systems	221
Collaborating with industry professionals	268
Missing	0
Other - Senior management support	1
	1162

Source: Questionnaire

According to results Investing in training and development of accounting professionals received the highest selection which is 325 responses. Partnering with technology vendors for support, standardizing data formats and systems and collaborating with industry professionals received next most respondents. These are not equal. This question allows respondents to select multiple answers.

## 5. RECOMMENDATIONS AND CONCLUSION

This section provides the recommendation and conclusion of the study. Each objective of the study is separately evaluated and provides recommendations and conclusions.

### 5.1. Recommendations and Conclusion

When looking at the current usage of big data analytics and AI in accounting practices are low, according to results from the survey, However, automation is already embraced by many organizations and is used in several accounting practices. Even though results indicate lower usage of big data analytics and AI in accounting practices, it is important to investigate industrywide as well as global trends.

The survey shows that most of the individuals use big data analytics tools for data visualization and reporting. Lack of trained staff is the main reason for not using big data analytics tools. Cost limitations and resource constraints, and a lack of awareness about benefits are other reasons for not integrating big data analytics in accounting practices. To overcome cost and resource constraints, organizations must properly plan their future investments, and there has to be a road map for implementing these big data analytics tools into accounting practices. Because looking at the results, it seems that organizations are not able to implement these tools suddenly.

When it comes to automation, for data entry and reconciliation, and for invoice processing, automation systems are heavily used. Generally, most of the accounting systems and ERP systems provide those with the system. For tax calculations, automation systems are not used widely. Sometimes, the complexity of the current tax mechanism can be the reason for this. Implementation cost seems to be the main reason for not using automation in accounting practices.

When it comes to AI, most of the time AI integrated software is used for predictive analytics for financial decisions. Generally, usage of AI is lower in accounting practices. The main reasons for not using AI in accounting practices are high upfront investment costs and a lack of training and expertise within the organization. These issues are addressed by Odonkor, Kaggwa, Uwaoma, Hassan, & Farayola, (2024) in their study. To overcome those issues, organizations need to come up with a proper investment plan and strategy.

Further, when it considers the current usage of big data analytics, automation, and AI, it receives lower results of integration with accounting practices. The mean for using these technologies goes for 2.6. However, if it is removed from the automation, result would be very low. It can be concluded that usage of technological advancements in accounting practices is lower. and organizations need to come up with strategies to deal with these and increase the usage of these technologies.

According to findings, it is identified that big data analytics tools significantly increase the efficiency of financial reporting. Therefore, organizations in the future must use these tools to increase their efficiency in accounting practices. Also, it is identified that automation leads to significantly increasing the accuracy of financial data and information. Therefore, accounting professionals are highly confident in data and information exact from automation systems. Wilson & Sangster, (1992) confirm that automation leads to higher confidence in accounting practices. Therefore,

organizations take necessary steps to increase the usage of automation systems in the future. On the other hand, it is found that integrating AI tools in accounting software leads to increased the productivity of accounting professionals. Therefore, using AI integrated software organization can increase productivity of accounting practices. Therefore, from minimum accounting professionals, organizations are able to get their output.

When it concludes challenges for integrating big data analytics, automation, and AI change management and user resistance and lack of technical skills and expertise are the biggest challenges. Therefore, organizations need to consider these and come up with strategies to overcome these challenges. Also, it seems that some accounting professionals are resistant to using and implementing these techniques in accounting practices, mainly because of lower IT expertise and resource limitations. For that, organizations also need to address these strategically.

When it comes to effective implementation of these technologies, most respondents mentioned investing in training and development for accounting professionals is the most suitable solution. In the above, it is identified that lack of training and expertise is the main issue when using big data analytics and AI in accounting practices. Russom, (2011) mentioned lack of skilled staff is one of key issues in using big data analytics, but the issue is still not solved. Therefore, this solution seems to be reliable. On the other hand, it is found some accounting professionals are resisting due to a lack of knowledge of these technologies, and training and development is going to be a perfect solution.

On the other hand, to get the maximum benefit from these technologies, organizations need to partner with technology vendors for support and collaborate with industry professionals. By doing this, it can increase awareness of these technologies, be able to get best practices, identification of latest developments, and benefit from using these technologies. Further, organizations need to standardize data formats and systems internally. Without doing those, it cannot use these technologies since it will generate wrong data and information for the users. By focusing on the above organizations, they are able to produce strategies and solutions to get better support from these technological advancements. Eventually this leads to achieving a competitive advantage over other competitors.

## **5.2. Implications of the Study for the Field of Accounting**

According to the findings of the study, these implications have been identified, and need to be addressed. It seems that in the future accountants will need to deal with these technologies and these effects on their career if they are not adapted to these changes. Also, accountants who are familiar with these advancements tend to come up with a broader analysis of the organization. Therefore, organizations can analyze their performance from a broader view.

Also, organizations that do not embrace these technologies will lose their competitiveness. The study indicates that big data analytics can significantly increase the efficiency of financial reporting, while automation enhances accuracy and AI improves the productivity of accounting professionals. Therefore, organizations that do not use these will affect their competitiveness.

On the other hand, when it comes to adoption of big data analytics, automation, and AI, change management and resistance are evident due to a lack of expertise, user resistance, and lack of training. Therefore, in the field of accounting these issues need to be clearly addressed and come up with effective training and development and change management strategies to get the most from these technologies.

### **5.3. Recommendations for Practitioners, Policymakers, and Educators**

For practitioners' point of view, it should continuously update the accounting professionals about these technological advancements and needs to take actions to fill the existing gaps. For that, there must be training and development sessions to empower accounting professionals with these technologies. Organizations need to come up with clear strategies and road maps to implement these technologies to get maximum benefit for their operations. In here it needs to consider the cost, return on investment, and availability of resources. Also, organizations need to continuously collaborate with technology vendors who have updated knowledge of these technological advancements. This collaboration will guide the organization to the latest advancements, best practices, and expert support.

When it comes to policy makers for technology adoption, they can provide incentives. In here they can offer tax incentives, grants, or subsidies for organizations that invest in big data analytics, automation, and AI. These will boost the technology adoption of and encourage the organizations to embrace these technologies.

In the view of educators, in the future they must include these technological advancements in accounting related programs. In here it is advised to develop curriculum that reflects these technologic advancements. This enables accounting professionals to learn and empower recent technological advancements. Therefore, some gaps will be fulfilled within these programs. In here programs will be academic programs like degree programs and professional accounting programs. Further, these educators can collaborate with industry professionals to enhance the knowledge and skills related to these technological advancements. They can conduct training and development programs, seminars, workshops, etc. By doing this, it can enhance the understanding of these big data analytics, automation, and AI to students.

### **5.4. Limitations and Future Research**

This study focuses on a specific set of respondents, which indicates it does not represent the entire accounting industry. On the other hand, sample biases are due to using convenient sampling techniques. Therefore, in the future it needs to increase the sampling strategy to represent the larger number of accounting professionals. Also, this study generalizes the usage of big data analytics, automation, and AI. Therefore, it is suggested to focus on specific areas of these technological advancements to get a deeper understanding. This study does not focus deeply on the cost benefits of technological advancements on selected accounting practices; therefore, it is valuable to consider these in the future. Here, it should focus on short-term and long-term cost benefits for the organization. Also, in the future it is important to focus on challenges faced by organizations with more mature implementations of these technologies.

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## 7. APPENDIX A: QUESTIONNAIRE

Dear Accounting Professional,

My name is T K Dinush Madushanka, and I am a Master of Business Administration (MBA) student specializing in Information Technology at the University of Moratuwa. I am conducting a research study to explore how technology is impacting the accounting profession.

This survey aims to understand the current adoption of **big data analytics, automation, and artificial intelligence (AI)** in accounting practices and how these advancements are perceived to be affecting **efficiency and accuracy** of accounting tasks.

Your participation in this survey is completely **anonymous** and will take approximately **10-15 minutes** to complete. Your honest insights will be invaluable to this research.

By clicking "Next," you indicate your consent to participate in this survey.

Thank you for your time and valuable contribution!

Sincerely,

T K Dinush Madushanka

University of Moratuwa

### Part A - General Information

1. Age
  - a. Less than 20 years
  - b. 21 – 25 years
  - c. 26 – 30 years
  - d. 31 – 35 years
  - e. Above 36 years
2. Gender
  - a. Male
  - b. Female
  - c. Prefer not to say.
3. Years of working experience in accounting
  - a. Less than 1 year
  - b. 1 – 5 years

- c. 6 – 10 years
  - d. Above 10 years
4. What is the size of your organization (number of employees)?
- a. 1-50 employees
  - b. 51-250 employees
  - c. 251-1000 employees
  - d. 1000+ employees

## **Part B - Implementation of Technological Tools**

### **Big Data Analytics**

5. Do you currently utilize big data analytics tools for accounting tasks? (Yes/No)
6. If **YES** (to question 5), for what purposes do you use big data analytics tools? (Select all that apply)
- a. Data visualization and reporting
  - b. Fraud detection and risk management
  - c. Trend analysis and forecasting
  - d. Other (please specify)
7. If **NO** (to question 5), what are the main reasons for not using big data analytics tools? (Select all that apply)
- a. Lack of awareness about benefits
  - b. Cost and resource limitations
  - c. Data security concerns
  - d. Lack of skilled personnel
  - e. Other (please specify)

### **Automation**

8. Does your practice utilize any automated accounting systems (e.g., accounts payable/receivable automation, robotic process automation)?
- a. (Yes/No)
9. If **YES** (to question 8), which accounting tasks are automated in your practice? (Select all that apply)
- a. Data entry and reconciliation

- b. Invoice processing.
- c. Transaction coding and classification
- d. Tax calculations.
- e. Other (please specify)

10. If **NO** (to question 8), why haven't you implemented automated accounting systems? (Select all that apply)

- a. Data entry and quality issues in entry level
- b. Integration challenges with existing systems
- c. Implementation costs
- d. Lack of trust in automation accuracy
- e. Other (please specify)

### **Artificial Intelligence (AI)**

11. Does your practice use any accounting software integrated with AI functionalities? (Yes/No)

12. If **YES** (to question 11), what AI functionalities do you leverage? (Select all that apply)

- a. Fraud prediction and auditing tasks
- b. Automated bookkeeping tasks
- c. Automated reconciliation tasks
- d. Predictive analytics for financial decisions
- e. Other (please specify)

13. If **NO** (to question 11), what are the main barriers to adopting AI-integrated accounting software? (Select all that apply)

- a. High upfront investment costs
- b. Ethical concerns about AI
- c. Transparency and explainability limitations
- d. Lack of training and expertise
- e. Other (please specify)

14. On a scale of 1 to 5, how extensively are big data analytics, automation and artificial intelligence tools implemented in accounting practices in your organization?

(1 = Not implemented at all, 5 = Fully implemented)

**Part – C**

15. To what extent has/will the implementation of big data analytics tools improved/improve the efficiency of financial reporting processes?

- a. Significantly improved.
- b. Somewhat improved
- c. No change
- d. Somewhat decreased
- e. Significantly decreased.

16. Elaborate your answer to question 15.

17. The use of big data analytics has/will reduced/reduce the amount of time required to complete financial reports.

- a. Strongly agree.
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree.

18. How confident are you in the accuracy of financial data and information processed through automated accounting systems? (Select one)

- a. Very confident
- b. Somewhat confident
- c. Neutral

- d. Somewhat concerned.
- e. Very concerned

19. Elaborate your answer to question 18.

20. Has/Will automating accounting tasks reduced/reduce errors in financial data and information?

- a. Strongly agree.
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree.

21. How/Will the use of AI-integrated accounting software impacted/impact the productivity of accounting professionals?? (Select one)

- a. Significantly increased.
- b. Somewhat increased
- c. No change
- d. Somewhat decreased
- e. Significantly decreased.

22. Elaborate your answer to question 21.

23. The use of AI in accounting tasks has/will freed/free up accounting professionals' time to focus on more complex accounting activities?

- a. Strongly agree.
- b. Agree
- c. Neither agree nor disagree
- d. Disagree

- e. Strongly disagree.

**Part – D Challenges and Strategies**

24. What are the biggest challenges your accounting practice faces in integrating big data analytics, automation, and AI into accounting tasks? (Select all that apply)

- a. Data quality and standardization issues
- b. Cybersecurity threats and data privacy concerns
- c. Change management and user resistance.
- d. Lack of technical skills and expertise
- e. Other (please specify)

25. Have you encountered any resistance from accounting professionals towards the adoption of these technologies (big data analytics, automation, and artificial intelligence)? If yes, please specify the reasons. (Open-ended)

26. In your opinion, what strategies can be most effective for leveraging big data analytics, automation, and artificial intelligence to enhance efficiency and accuracy in accounting practices? (Select all that apply)

- a. Investing in training and development of accounting professionals
- b. Implementing robust data governance frameworks
- c. Partnering with technology vendors for support
- d. Standardizing data formats and systems
- e. Collaborating with industry professionals
- f. Other (please specify)